



Welding machine

Taurus 355 Synergic S TDM

Taurus 405 Synergic S TDM

Taurus 505 Synergic S TDM

099-005219-EW501

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10.06.2013

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General instructions

CAUTION



Read the operating instructions!

The operating instructions provide an introduction to the safe use of the products.

- Read the operating instructions for all system components!
- Observe accident prevention regulations!
- Observe all local regulations!
- Confirm with a signature where appropriate.

NOTE



In the event of queries on installation, commissioning, operation or special conditions at the installation site, or on usage, please contact your sales partner or our customer service department on +49 2680 181-0.

A list of authorised sales partners can be found at www.ewm-group.com.

Liability relating to the operation of this equipment is restricted solely to the function of the equipment. No other form of liability, regardless of type, shall be accepted. This exclusion of liability shall be deemed accepted by the user on commissioning the equipment.

The manufacturer is unable to monitor whether or not these instructions or the conditions and methods are observed during installation, operation, usage and maintenance of the equipment.

An incorrectly performed installation can result in material damage and injure persons as a result. For this reason, we do not accept any responsibility or liability for losses, damages or costs arising from incorrect installation, improper operation or incorrect usage and maintenance or any actions connected to this in any way.

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2 Safety instructions

2.1 Notes on the use of these operating instructions



DANGER

Working or operating procedures which must be closely observed to prevent imminent serious and even fatal injuries.

- Safety notes include the "DANGER" keyword in the heading with a general warning symbol.
- The hazard is also highlighted using a symbol on the edge of the page.



WARNING

Working or operating procedures which must be closely observed to prevent serious and even fatal injuries.

- Safety notes include the "WARNING" keyword in the heading with a general warning symbol.
- The hazard is also highlighted using a symbol in the page margin.



CAUTION

Working or operating procedures which must be closely observed to prevent possible minor personal injury.

- The safety information includes the "CAUTION" keyword in its heading with a general warning symbol.
- The risk is explained using a symbol on the edge of the page.

CAUTION

Working and operating procedures which must be followed precisely to avoid damaging or destroying the product.

- The safety information includes the "CAUTION" keyword in its heading without a general warning symbol.
- The hazard is explained using a symbol at the edge of the page.

NOTE








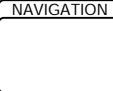





Special technical points which users must observe.

- Notes include the "NOTE" keyword in the heading without a general warning symbol.

Instructions and lists detailing step-by-step actions for given situations can be recognised via bullet points, e.g.:

- Insert the welding current lead socket into the relevant socket and lock.

2.2 Explanation of icons

Symbol	Description
	Press
	Do not press
	Turn
	Switch
	Switch off machine
	Switch on machine
	ENTER (enter the menu)
	NAVIGATION (Navigating in the menu)
	EXIT (Exit the menu)
	Time display (example: wait 4s/press)
	Interruption in the menu display (other setting options possible)
	Tool not required/do not use
	Tool required/use

2.3 General



DANGER



Electromagnetic fields!

The power source may cause electrical or electromagnetic fields to be produced which could affect the correct functioning of electronic equipment such as IT or CNC devices, telecommunication lines, power cables, signal lines and pacemakers.

- Observe the maintenance instructions! (see Maintenance and Testing chapter)
- Unwind welding leads completely!
- Shield devices or equipment sensitive to radiation accordingly!
- The correct functioning of pacemakers may be affected (obtain advice from a doctor if necessary).



Do not carry out any unauthorised repairs or modifications!

To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!

The warranty becomes null and void in the event of unauthorised interference.

- Appoint only skilled persons for repair work (trained service personnel)!



Electric shock!

Welding machines use high voltages which can result in potentially fatal electric shocks and burns on contact. Even low voltages can cause you to get a shock and lead to accidents.

- Do not touch any live parts in or on the machine!
- Connection cables and leads must be free of faults!
- Switching off alone is not sufficient!
- Place welding torch and stick electrode holder on an insulated surface!
- The unit should only be opened by specialist staff after the mains plug has been unplugged!
- Only wear dry protective clothing!
- Wait for 4 minutes until the capacitors have discharged!



WARNING



Risk of injury due to radiation or heat!

Arc radiation results in injury to skin and eyes.

Contact with hot workpieces and sparks results in burns.

- Use welding shield or welding helmet with the appropriate safety level (depending on the application)!
- Wear dry protective clothing (e.g. welding shield, gloves, etc.) according to the relevant regulations in the country in question!
- Protect persons not involved in the work against arc beams and the risk of glare using safety curtains!



Explosion risk!

Apparently harmless substances in closed containers may generate excessive pressure when heated.

- Move containers with inflammable or explosive liquids away from the working area!
- Never heat explosive liquids, dusts or gases by welding or cutting!

WARNING



Smoke and gases!

Smoke and gases can lead to breathing difficulties and poisoning. In addition, solvent vapour (chlorinated hydrocarbon) may be converted into poisonous phosgene due to the ultraviolet radiation of the arc!

- Ensure that there is sufficient fresh air!
- Keep solvent vapour away from the arc beam field!
- Wear suitable breathing apparatus if appropriate!



Fire hazard!

Flames may arise as a result of the high temperatures, stray sparks, glowing-hot parts and hot slag produced during the welding process.

Stray welding currents can also result in flames forming!

- Check for fire hazards in the working area!
- Do not carry any easily flammable objects such as matches or lighters.
- Keep appropriate fire extinguishing equipment to hand in the working area!
- Thoroughly remove any residue of flammable substances from the workpiece before starting welding.
- Only continue work on welded workpieces once they have cooled down.
Do not allow to come into contact with flammable material!
- Connect welding leads correctly!



Risk of accidents if these safety instructions are not observed!

Non-observance of these safety instructions is potentially fatal!

- Carefully read the safety information in this manual!
- Observe the accident prevention regulations in your country.
- Inform persons in the working area that they must observe the regulations!



Danger when coupling multiple power sources!

Coupling multiple power sources in parallel or in series has to be carried out by qualified personnel and in accordance with the manufacturer's guidelines. Before bringing the power sources into service for arc welding operations, a test has to verify that they cannot exceed the maximum allowed open circuit voltage.

- Connection of the machine may be carried out by qualified personnel only!
- When decommissioning individual power sources, all mains and welding current leads have to be safely disconnected from the welding system as a whole. (danger due to inverse voltages)!

CAUTION



Noise exposure!

Noise exceeding 70 dBA can cause permanent hearing damage!

- Wear suitable ear protection!
- Persons located within the working area must wear suitable ear protection!

CAUTION**Obligations of the operator!**

The respective national directives and laws must be observed for operation of the machine!

- National implementation of the framework directive (89/391/EEG), as well as the associated individual directives.
- In particular, directive (89/655/EEG), on the minimum regulations for safety and health protection when staff members use equipment during work.
- The regulations regarding work safety and accident prevention for the respective country.
- Setting up and operating the machine according to IEC 60974-9.
- Check at regular intervals that users are working in a safety-conscious way.
- Regular checks of the machine according to IEC 60974-4.

**Damage due to the use of non-genuine parts!**

The manufacturer's warranty becomes void if non-genuine parts are used!

- Only use system components and options (power sources, welding torches, electrode holders, remote controls, spare parts and replacement parts, etc.) from our range of products!
- Only insert and lock accessory components into the relevant connection socket when the machine is switched off.

**Damage to the machine due to stray welding currents!**

Stray welding currents can destroy protective earth conductors, damage equipment and electronic devices and cause overheating of components leading to fire.

- Make sure all welding leads are securely connected and check regularly.
- Always ensure a proper and secure electrical connection to the workpiece!
- Set up, attach or suspend all conductive power source components like casing, transport vehicle and crane frames so they are insulated!
- Do not place any other electronic devices such as drillers or angle grinders, etc., on the power source, transport vehicle or crane frames unless they are insulated!
- Always put welding torches and electrode holders on an insulated surface when they are not in use!

**Mains connection****Requirements for connection to the public mains network**

High-performance machines can influence the mains quality by taking current from the mains network. For some types of machines, connection restrictions or requirements relating to the maximum possible line impedance or the necessary minimum supply capacity at the interface with the public network (Point of Common Coupling, PCC) can therefore apply. In this respect, attention is also drawn to the machines' technical data. In this case, it is the responsibility of the operator, where necessary in consultation with the mains network operator, to ensure that the machine can be connected.

CAUTION



EMC Machine Classification

In accordance with IEC 60974-10, welding machines are grouped in two electromagnetic compatibility classes (see technical data):

Class A machines are not intended for use in residential areas where the power supply comes from the low-voltage public mains network. When ensuring the electromagnetic compatibility of class A machines, difficulties can arise in these areas due to interference not only in the supply lines but also in the form of radiated interference.

Class B machines fulfil the EMC requirements in industrial as well as residential areas, including residential areas connected to the low-voltage public mains network.

Setting up and operating

When operating arc welding systems, in some cases, electro-magnetic interference can occur although all of the welding machines comply with the emission limits specified in the standard. The user is responsible for any interference caused by welding.

In order to **evaluate** any possible problems with electromagnetic compatibility in the surrounding area, the user must consider the following: (see also EN 60974-10 Appendix A)

- Mains, control, signal and telecommunication lines
- Radios and televisions
- Computers and other control systems
- Safety equipment
- The health of neighbouring persons, especially if they have a pacemaker or wear a hearing aid
- Calibration and measuring equipment
- The immunity to interference of other equipment in the surrounding area
- The time of day at which the welding work must be carried out

Recommendations for reducing interference emission

- Mains connection, e.g. additional mains filter or shielding with a metal tube
- Maintenance of the arc welding equipment
- Welding leads should be as short as possible and run closely together along the ground
- Potential equalization
- Earthing of the workpiece. In cases where it is not possible to earth the workpiece directly, it should be connected by means of suitable capacitors.
- Shielding from other equipment in the surrounding area or the entire welding system

2.4 Transport and installation

WARNING

**Incorrect handling of shielding gas cylinders!**

Incorrect handling of shielding gas cylinders can result in serious and even fatal injury.

- Observe the instructions from the gas manufacturer and in any relevant regulations concerning the use of compressed air!
- Place shielding gas cylinders in the holders provided for them and secure with fixing devices.
- Avoid heating the shielding gas cylinder!

**Risk of accident due to improper transport of machines that may not be lifted!**

Do not lift or suspend the machine! The machine can fall down and cause injuries! The handles and brackets are suitable for transport by hand only!

- The machine may not be lifted by crane or suspended!

CAUTION

**Risk of tipping!**

There is a risk of the machine tipping over and injuring persons or being damaged itself during movement and set up. Tilt resistance is guaranteed up to an angle of 10° (according to IEC 60974-1).

- Set up and transport the machine on level, solid ground.
- Secure add-on parts using suitable equipment.

**Damage due to supply lines not being disconnected!**

During transport, supply lines which have not been disconnected (mains supply leads, control leads, etc.) may cause hazards such as connected equipment tipping over and injuring persons!

- Disconnect supply lines!

CAUTION

**Equipment damage when not operated in an upright position!**

The units are designed for operation in an upright position!

Operation in non-permissible positions can cause equipment damage.

- Only transport and operate in an upright position!

2.4.1 Ambient conditions

CAUTION



Installation site!

The machine must not be operated in the open air and must only be set up and operated on a suitable, stable and level base!

- The operator must ensure that the ground is non-slip and level, and provide sufficient lighting for the place of work.
- Safe operation of the machine must be guaranteed at all times.

CAUTION



Equipment damage due to dirt accumulation!

Unusually high quantities of dust, acid, corrosive gases or substances may damage the equipment.

- Avoid high volumes of smoke, vapour, oil vapour and grinding dust!
- Avoid ambient air containing salt (sea air)!



Non-permissible ambient conditions!

Insufficient ventilation results in a reduction in performance and equipment damage.

- Observe the ambient conditions!
- Keep the cooling air inlet and outlet clear!
- Observe the minimum distance of 0.5 m from obstacles!

2.4.1.1 In operation

Temperature range of the ambient air:

- -25 °C to +40 °C

Relative air humidity:

- Up to 50% at 40 °C
- Up to 90% at 20 °C

2.4.1.2 Transport and storage

Storage in an enclosed space, temperature range of the ambient air:

- -30 °C to +55 °C

Relative air humidity

- Up to 90% at 20 °C

3 Intended use

This machine has been manufactured according to the latest developments in technology and current regulations and standards. It must only be operated in line with the instructions on correct usage.



WARNING



Hazards due to improper usage!

Hazards may arise for persons, animals and material objects if the equipment is not used correctly. No liability is accepted for any damages arising from improper usage!

- The equipment must only be used in line with proper usage and by trained or expert staff!
- Do not modify or convert the equipment improperly!

3.1 Use and operation solely with the following machines

NOTE



A suitable wire feed unit (system component) is required in order to operate the welding machine!

Wire feed unit

- Taurus Synergic S drive 4
- Taurus Synergic S drive 4L
- Taurus Synergic S drive 200C
- Taurus Synergic S drive 300C

Transport vehicle

- Trolley 55.2-2

Cooling unit

- cool50-2 U40

Remote control

- R40

3.2 Applications

3.2.1 MIG/MAG standard welding

Metal arc welding using a wire electrode whereby gas from an external source surrounds the arc and the molten pool to protect them from the atmosphere.

3.2.1.1 forceArc

Welding with a powerful forced arc, deep fusion penetration and virtually spatter-free weld seams of the highest quality.

3.2.1.2 rootArc

Stable, soft, short arc even with long welding leads; ideal for simple, reliable root welding without pool support, easy gap bridging.

3.2.2 TIG (Liftarc) welding

TIG welding process with arc ignition by means of workpiece contact.

3.2.3 MMA welding

Manual arc welding or, for short, MMA welding. It is characterised by the fact that the arc burns between a melting electrode and the molten pool. There is no external protection; any protection against the atmosphere comes from the electrode.

3.2.3.1 Air arc gouging

During air arc gouging, bad welding seams are heated with a carbon electrode and then removed with compressed air. Special electrode holders and carbon electrodes are required for air arc gouging.

3.3 Documents which also apply

3.3.1 Warranty

NOTE



For further information, please see the accompanying supplementary sheets "Machine and Company Data, Maintenance and Testing, Warranty"!

3.3.2 Declaration of Conformity



The designated machine conforms to EC Directives and standards in terms of its design and construction:

- EC Low Voltage Directive (2006/95/EC),
- EC EMC Directive (2004/108/EC),

This declaration shall become null and void in the event of unauthorised modifications, improperly conducted repairs, non-observance of the deadlines for the repetition test and / or non-permitted conversion work not specifically authorised by the manufacturer.

The original copy of the declaration of conformity is enclosed with the unit.

3.3.3 Welding in environments with increased electrical hazards



In compliance with IEC / DIN EN 60974, VDE 0544 the machines can be used in environments with an increased electrical hazard.

3.3.4 Service documents (spare parts and circuit diagrams)



DANGER



Do not carry out any unauthorised repairs or modifications!

To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!

The warranty becomes null and void in the event of unauthorised interference.

- Appoint only skilled persons for repair work (trained service personnel)!

Original copies of the circuit diagrams are enclosed with the unit.

Spare parts can be obtained from the relevant authorised dealer.

3.3.5 Calibration/Validation

We hereby confirm that this machine has been tested using calibrated measuring equipment, as stipulated in IEC/EN 60974, ISO/EN 17662, EN 50504, and complies with the admissible tolerances. Recommended calibration interval: 12 months

4 Machine description – quick overview

NOTE



The maximum possible machine configuration is given in the text description. If necessary, the optional connection may need to be retrofitted (see "Accessories" chapter).

4.1 Front view

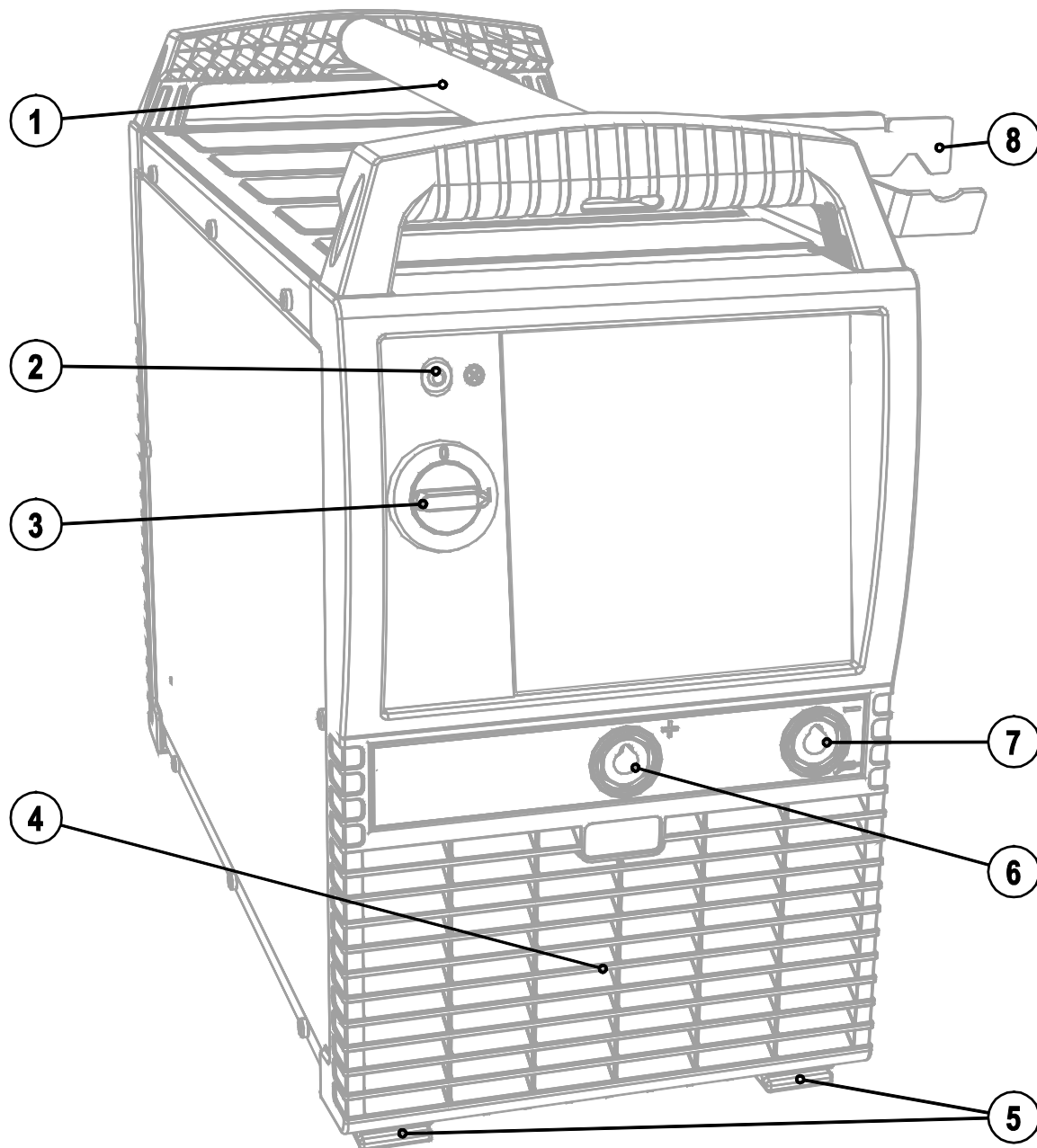






Figure 4-1

Item	Symbol	Description
1		Carrying handle
2		Ready for operation signal light Signal light on when the machine is switched on and ready for operation
3		Main switch, machine on/off
4		Cooling air inlet
5		Machine feet
6		Connection socket, "+" welding current <ul style="list-style-type: none"> MIG/MAG cored wire welding: Workpiece connection TIG welding: Workpiece connection MMA welding: Workpiece connection
7		"-" welding current connection socket <ul style="list-style-type: none"> MIG/MAG welding: Workpiece connection MMA welding: electrode holder connection
8		Torch holder

4.2 Rear view

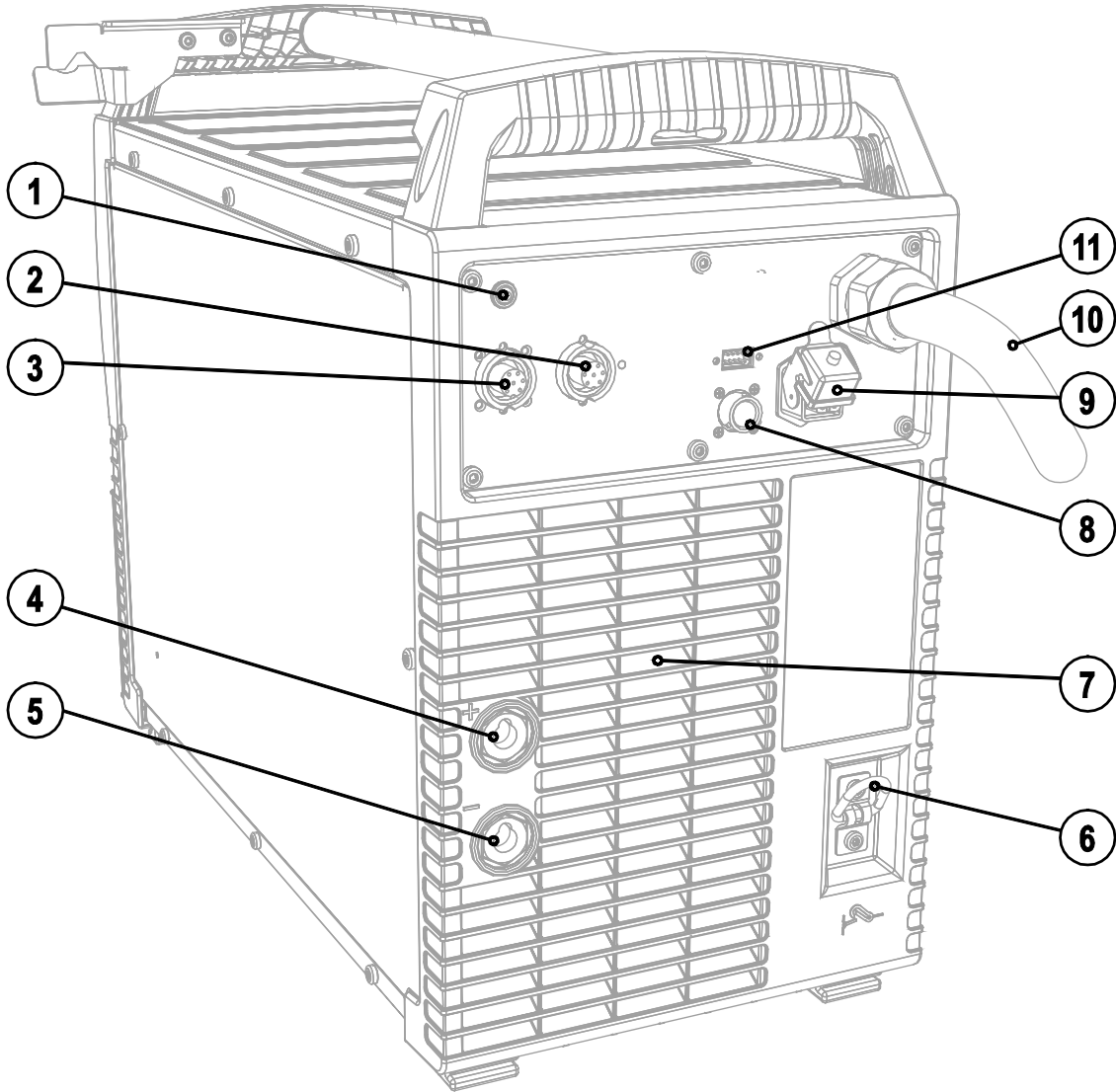
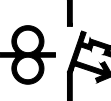








Figure 4-2

Item	Symbol	Description
1		Key button, Automatic cutout Wire feed motor supply voltage fuse (press to reset a triggered fuse)
2		Connection socket, 7-pole Connection for peripheral devices with digital interface
3		7-pole connection socket (digital) Wire feed unit connection
4		Connection socket, “+” welding current • Standard MIG/MAG welding (intermediate hose package)
5		Connection socket, “-” welding current Connection for welding current plug from intermediate hose package • MIG/MAG flux cored wire welding • TIG welding
6		Stirrup Intermediate hose package strain relief
7		Cooling air outlet
8		8-pole connection socket Cooling unit control lead
9		4-pole connection socket Cooling unit voltage supply
10		Mains connection cable
11		PC interface, serial (D-Sub connection socket, 9-pole)

5 Design and function

5.1 General

WARNING



Risk of injury from electric shock!

Contact with live parts, e.g. welding current sockets, is potentially fatal!

- Follow safety instructions on the opening pages of the operating instructions.
- Commissioning may only be carried out by persons who have the relevant expertise of working with arc welding machines!
- Connection and welding leads (e.g. electrode holder, welding torch, workpiece lead, interfaces) may only be connected when the machine is switched off!

CAUTION



Insulate the arc welder from welding voltage!

Not all active parts of the welding current circuit can be shielded from direct contact. To avoid any associated risks it is vital for the welder to adhere to the relevant safety regulations. Even low voltages can cause a shock and lead to accidents.

- Wear dry and undamaged protective clothing (shoes with rubber soles/welder's gloves made from leather without any studs or braces)!
- Avoid direct contact with non-insulated connection sockets or connectors!
- Always place torches and electrode holders on an insulated surface!



Risk of burns on the welding current connection!

If the welding current connections are not locked, connections and leads heat up and can cause burns, if touched!

- Check the welding current connections every day and lock by turning in clockwise direction, if necessary.



Risk from electrical current!

If welding is carried out alternately using different methods and if a welding torch and an electrode holder remain connected to the machine, the open-circuit/welding voltage is applied simultaneously on all cables.

- The torch and the electrode holder should therefore always be placed on an insulated surface before starting work and during breaks.

CAUTION



Damage due to incorrect connection!

Accessory components and the power source itself can be damaged by incorrect connection!

- Only insert and lock accessory components into the relevant connection socket when the machine is switched off.
- Comprehensive descriptions can be found in the operating instructions for the relevant accessory components.
- Accessory components are detected automatically after the power source is switched on.

CAUTION**Using protective dust caps!**

Protective dust caps protect the connection sockets and therefore the machine against dirt and damage.

- The protective dust cap must be fitted if there is no accessory component being operated on that connection.
- The cap must be replaced if faulty or if lost!

NOTE

Observe documentation of other system components when connecting!

5.2 Machine cooling

To obtain an optimal duty cycle from the power components, the following precautions should be observed:

- Ensure that the working area is adequately ventilated.
- Do not obstruct the air inlets and outlets of the machine.
- Do not allow metal parts, dust or other objects to get into the machine.

5.3 Workpiece lead, general

**CAUTION****Risk of burns due to incorrect connection of the workpiece lead!**

Paint, rust and dirt on the connection restrict the power flow and may lead to stray welding currents.

Stray welding currents may cause fires and injuries!

- Clean the connections!
- Fix the workpiece lead securely!
- Do not use structural parts of the workpiece as a return lead for the welding current!
- Take care to ensure faultless power connections!

5.4 Installation

WARNING



Risk of accident due to improper transport of machines that may not be lifted!

Do not lift or suspend the machine! The machine can fall down and cause injuries! The handles and brackets are suitable for transport by hand only!

- The machine may not be lifted by crane or suspended!
- Depending on machine type, equipment for lifting by crane or use while suspended is available as a retrofitting option (see chapter "Accessories").

CAUTION




Installation site!

The machine must not be operated in the open air and must only be set up and operated on a suitable, stable and level base!

- The operator must ensure that the ground is non-slip and level, and provide sufficient lighting for the place of work.
- Safe operation of the machine must be guaranteed at all times.

5.5 Notes on the installation of welding current leads

NOTE

-  Incorrectly installed welding current leads can cause faults in the arc (flickering).
- A** Install welding lead and hose package in parallel and as close together as possible.
- B** Keep the welding lead and hose packages of each welding machine separate, with an installation distance of at least 15 cm!
- C** Fully unroll welding current leads, torch hose packages and intermediate hose packages. Avoid loops!
- D** Use an individual welding lead to the workpiece for each welding machine!
Connect the work clamp close to the welding point.
- E** Always keep leads as short as possible!

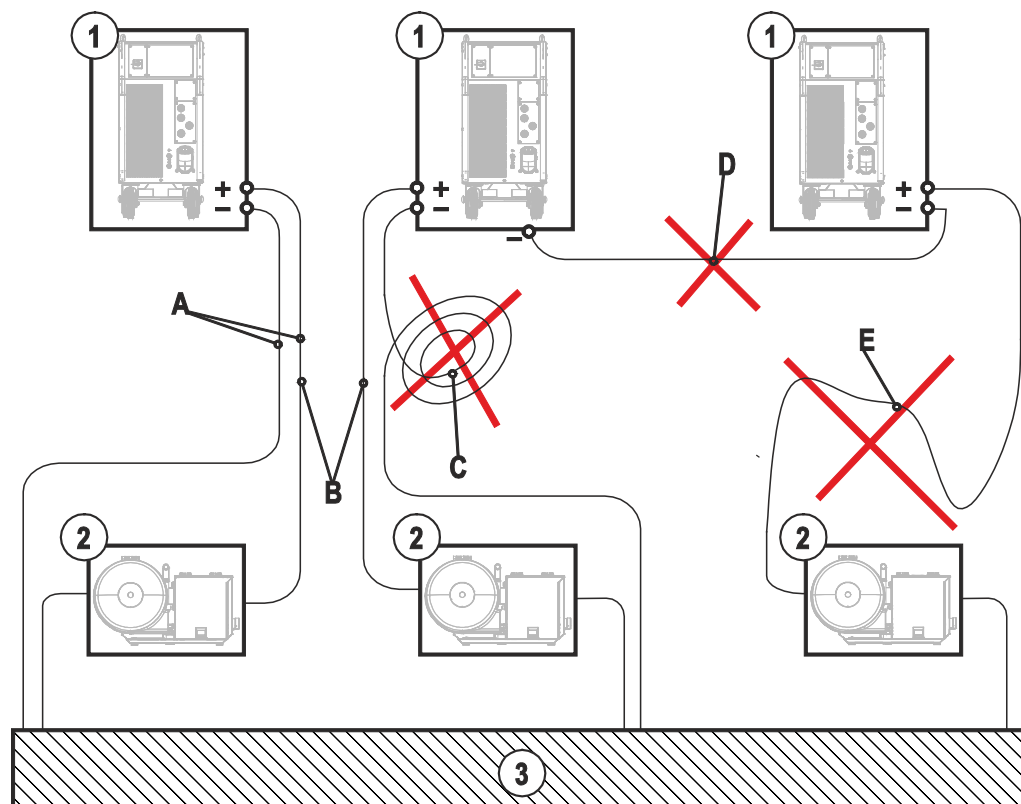




Figure 5-1

Item	Symbol	Description
1		Welding machine
2		Wire feed unit
3		Workpiece

5.6 Welding torch cooling system

5.6.1 Cooling module connection

NOTE

 Observe the fitting and connection instructions given in the relevant operating instructions for the cooling unit.

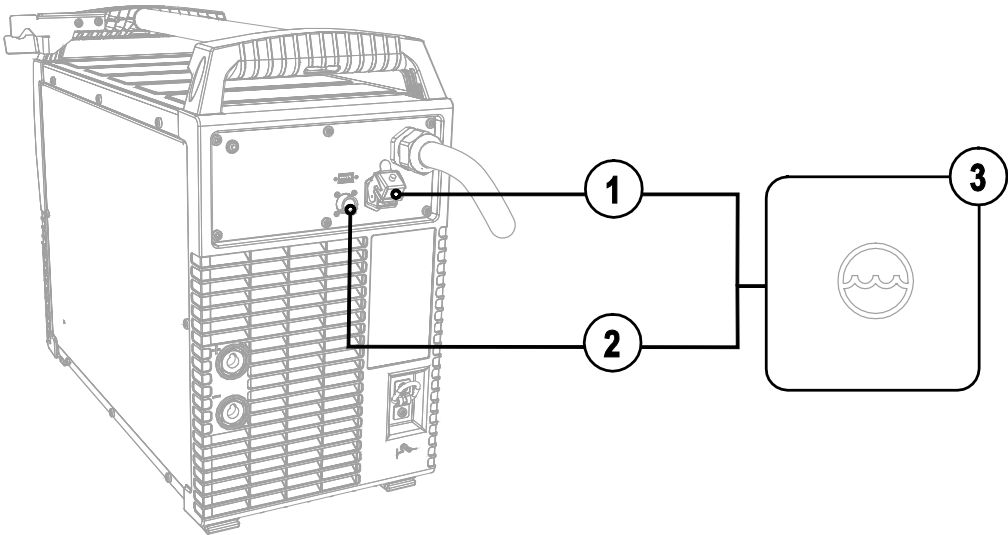





Figure 5-2

Item	Symbol	Description
1		4-pole connection socket Cooling unit voltage supply
2		8-pole connection socket Cooling unit control lead
3		Cooling module

- Insert and lock the 8-pole control lead plug on the cooling unit into the 8-pole connection socket on the welding machine.
- Insert and lock the 4-pole supply plug on the cooling unit into the 4-pole connection socket on the welding machine.

5.7 Mains connection



DANGER



Hazard caused by improper mains connection!

An improper mains connection can cause injuries or damage property!

- Only use machine with a plug socket that has a correctly fitted protective conductor.
- If a mains plug must be fitted, this may only be carried out by an electrician in accordance with the relevant national provisions or regulations!
- Mains plug, socket and lead must be checked regularly by an electrician!
- When operating the generator always ensure it is earthed as stated in the operating instructions. The resulting network has to be suitable for operating devices according to protection class 1.

5.7.1 Mains configuration

NOTE



The machine may be connected to:

- a three-phase system with four conductors and an earthed neutral conductor
- a three-phase system with three conductors of which any one can be earthed, e.g. the outer conductor

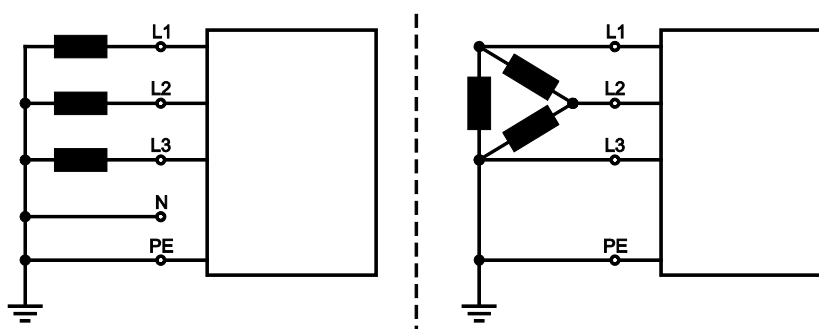


Figure 5-3

Legend

Item	Designation	Colour code
L1	Outer conductor 1	brown
L2	Outer conductor 2	black
L3	Outer conductor 3	grey
N	Neutral conductor	blue
PE	Protective conductor	green-yellow

CAUTION



Operating voltage - mains voltage!

The operating voltage shown on the rating plate must be consistent with the mains voltage, in order to avoid damage to the machine!

- For mains fuse protection, please refer to the "Technical data" chapter!

- Insert mains plug of the switched-off machine into the appropriate socket.

5.8 Connecting the intermediate hose package to the power source

5.8.1 Intermediate hose package strain relief

CAUTION



Missing or incorrectly fitted strain relief!
Connection sockets or connection plugs on the machine, or the intermediate tube package, may be damaged if the strain relief is missing or incorrectly fitted. The strain relief takes the strain from cables, plugs and sockets.

- Check the strain relief function by pulling in all directions. Cables and hoses must have sufficient play when the relief cord is fully stretched!

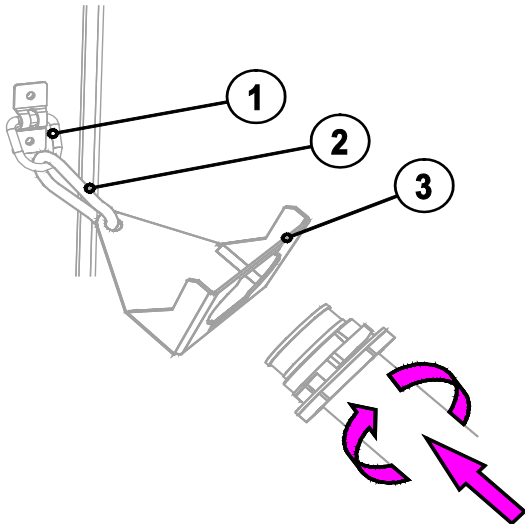


Figure 5-4

Item	Symbol	Description
1		Stirrup Intermediate hose package strain relief
2		Snap hooks
3		Intermediate hose package strain relief

- Insert the end of the hose package through the strain relief of the hose package and lock by turning to the right.

5.8.2 Intermediate hose package connection

NOTE



Note the polarity of the welding current!

Some wire electrodes (e.g. self-shielding cored wire) are welded using negative polarity. In this case, the welding current lead should be connected to the "-" welding current socket, and the workpiece lead should be connected to the "+" welding current socket.

- Observe the information from the electrode manufacturer!

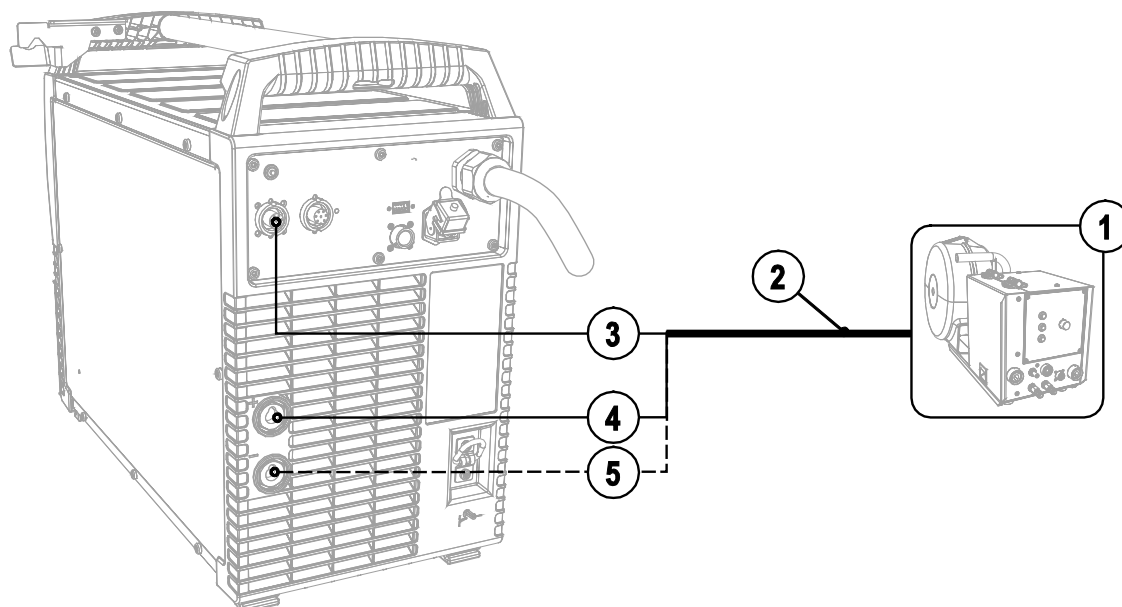





Figure 5-5

Item	Symbol	Description
1		Wire feed unit
2		Intermediate hose package
3		7-pole connection socket (digital) Wire feed unit connection
4		Connection socket, "+" welding current • Standard MIG/MAG welding (intermediate hose package)
5		Connection socket, "-" welding current Connection for welding current plug from intermediate hose package • MIG/MAG flux cored wire welding • TIG welding

- Insert the end of the hose package through the strain relief of the hose package and lock by turning to the right.
- Insert the plug of the welding current lead into the welding current connection socket and lock in place by turning to the right.
- Insert cable plug on the control lead into the 7-pole connection socket and secure with crown nut (the plug can only be inserted into the connection socket in one position).

5.9 Shielding gas supply (shielding gas cylinder for welding machine)

WARNING

Risk of injury due to improper handling of shielding gas cylinders! Improper handling and insufficient securing of shielding gas cylinders can cause serious injuries!

- The fastening elements must tightly enclose the shielding gas cylinder!
- Attach the fastening elements within the upper half of the shielding gas cylinder!
- Do not attach any element to the shielding gas cylinder valve!
- Observe the instructions from the gas manufacturer and any relevant regulations concerning the use of compressed air!
- Avoid heating the shielding gas cylinder!

CAUTION

Faults in the shielding gas supply.

An unhindered shielding gas supply from the shielding gas cylinder to the welding torch is a fundamental requirement for optimum welding results. In addition, a blocked shielding gas supply may result in the welding torch being destroyed.

- Always re-fit the yellow protective cap when not using the shielding gas connection.
- All shielding gas connections must be gas tight.

NOTE

Before connecting the pressure regulator to the gas cylinder, open the cylinder valve briefly to expel any dirt.

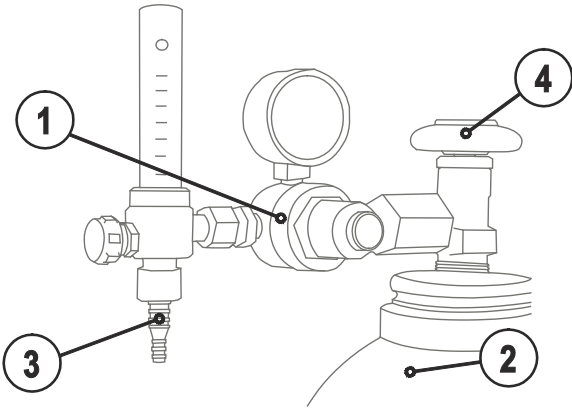



Figure 5-6

Item	Symbol	Description
1		Pressure regulator
2		Shielding gas cylinder
3		Output side of the pressure regulator
4		Cylinder valve

- Place the shielding gas cylinder into the relevant cylinder bracket.
- Secure the shielding gas cylinder using a securing chain.
- Tighten the pressure regulator screw connection on the gas bottle valve to be gas-tight.
- Screw the gas hose (intermediate hose package) to the pressure regulator ensuring that it is gas tight.

5.10 Welding torch holder

NOTE

 The item described in the following is part of the machine's scope of delivery.

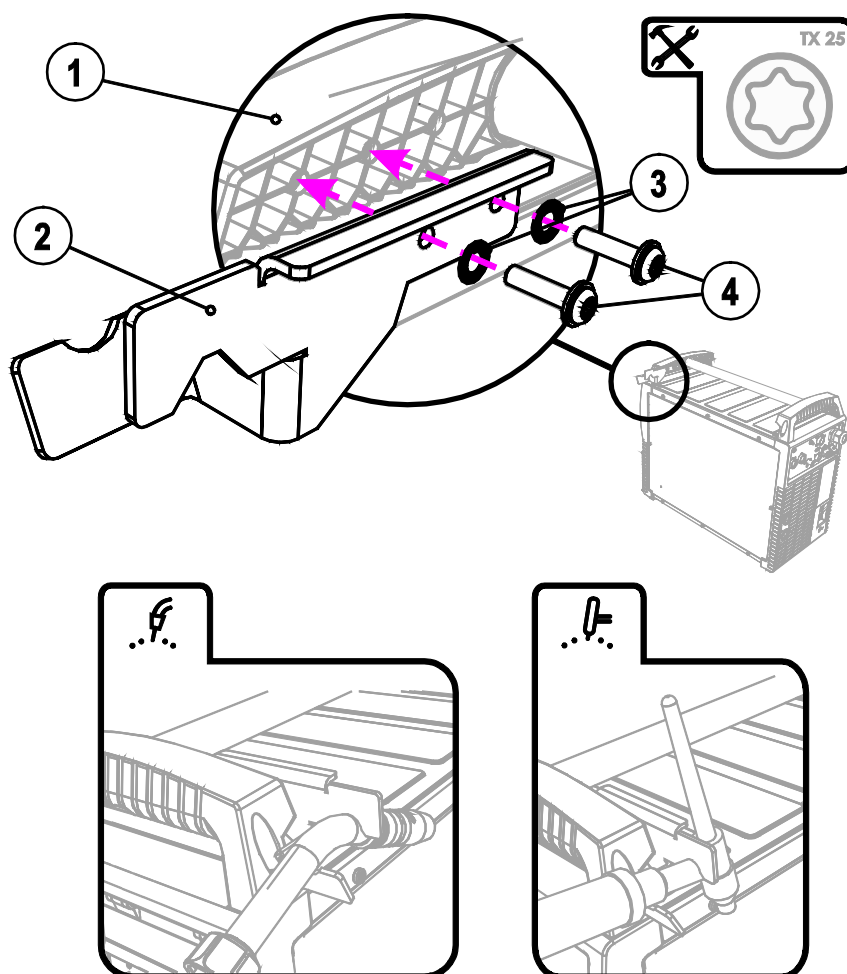


Figure 5-7


Item	Symbol	Description
1		Crossmember of the transport handle
2		Torch holder
3		Fan-type lock washers
4		Fixing screws (x 4)

- Use the mounting screws to screw the torch holder onto the crossmember of the transport handle.
- Insert the welding torch into the welding torch holder as shown.

5.11 MIG/MAG welding

5.11.1 Connection for workpiece lead

NOTE

 **Note the polarity of the welding current!**
Some wire electrodes (e.g. self-shielding cored wire) are welded using negative polarity. In this case, the welding current lead should be connected to the "-" welding current socket, and the workpiece lead should be connected to the "+" welding current socket.

- Observe the information from the electrode manufacturer!

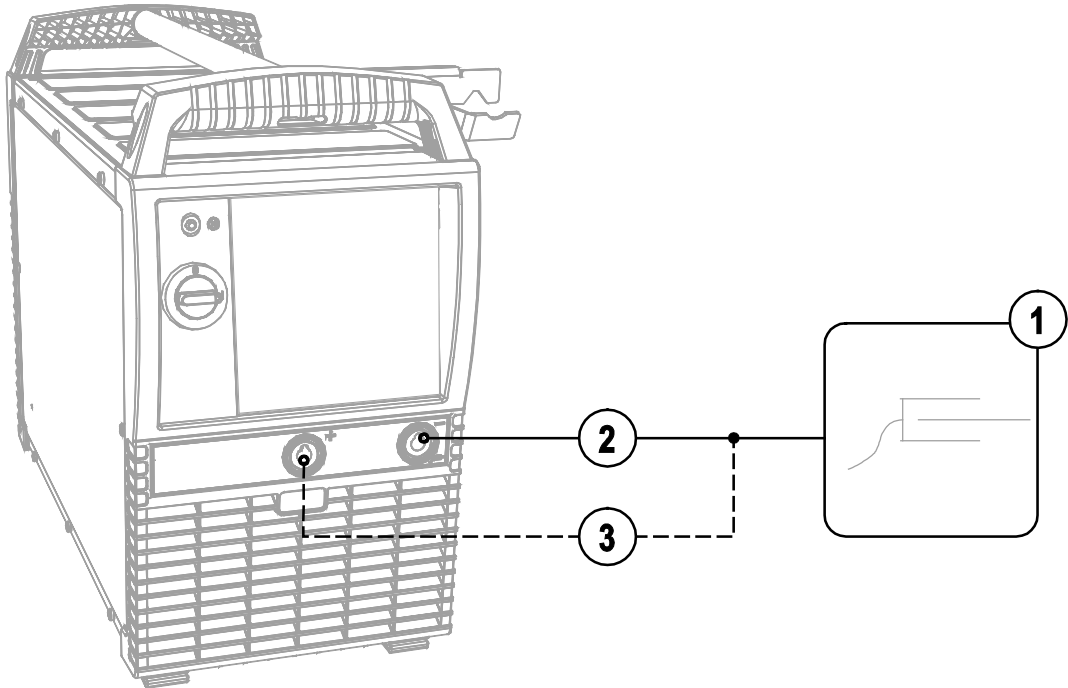





Figure 5-8

Item	Symbol	Description
1		Workpiece
2		"-" welding current connection socket <ul style="list-style-type: none">MIG/MAG welding: Workpiece connection
3		Connection socket, "+" welding current <ul style="list-style-type: none">MIG/MAG cored wire welding: Workpiece connection

- Insert the plug on the workpiece lead into the "-" welding current connection socket and lock.

5.12 TIG welding

5.12.1 Welding torch connection

NOTE



The welding torch is connected to the wire feeder.
Observe the operating instructions for the wire feeder (system component)!

5.12.2 Connection for workpiece lead

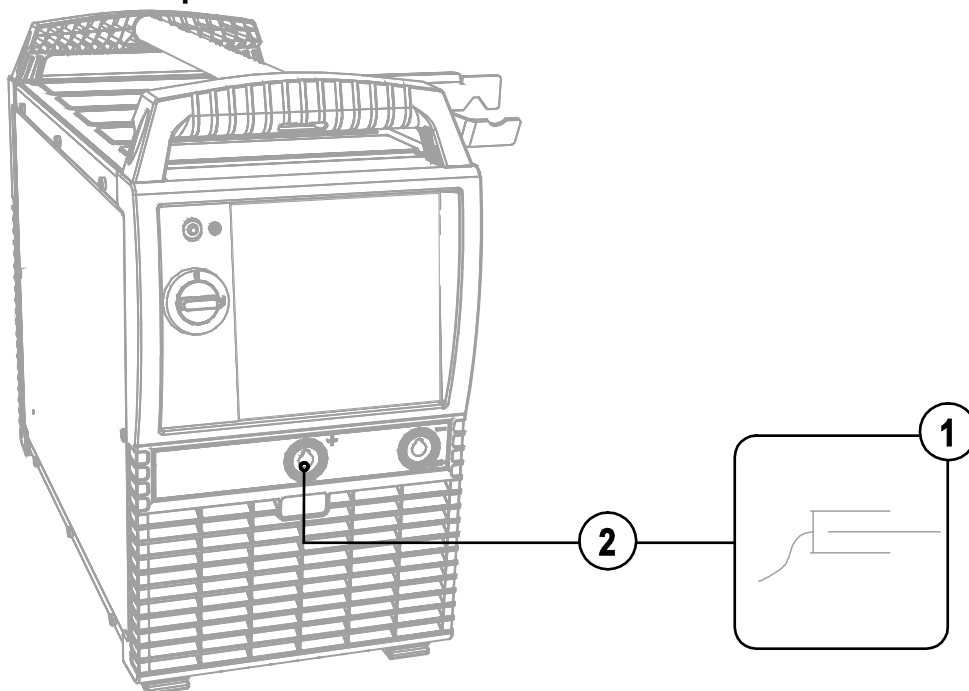






Figure 5-9

Item	Symbol	Description
1		Workpiece
2		Connection socket, "+" welding current <ul style="list-style-type: none"> TIG welding: Workpiece connection

- Insert the plug on the welding current lead into the welding current connection socket "+" and lock.

5.13 MMA welding

 **CAUTION**



Risk of being crushed or burnt.
When replacing spent or new stick electrodes

- Switch off machine at the main switch
- Wear appropriate safety gloves
- Use insulated tongs to remove spent stick electrodes or to move welded workpieces and
- Always put the electrode holder down on an insulated surface.

5.13.1 Connecting the electrode holder and workpiece lead

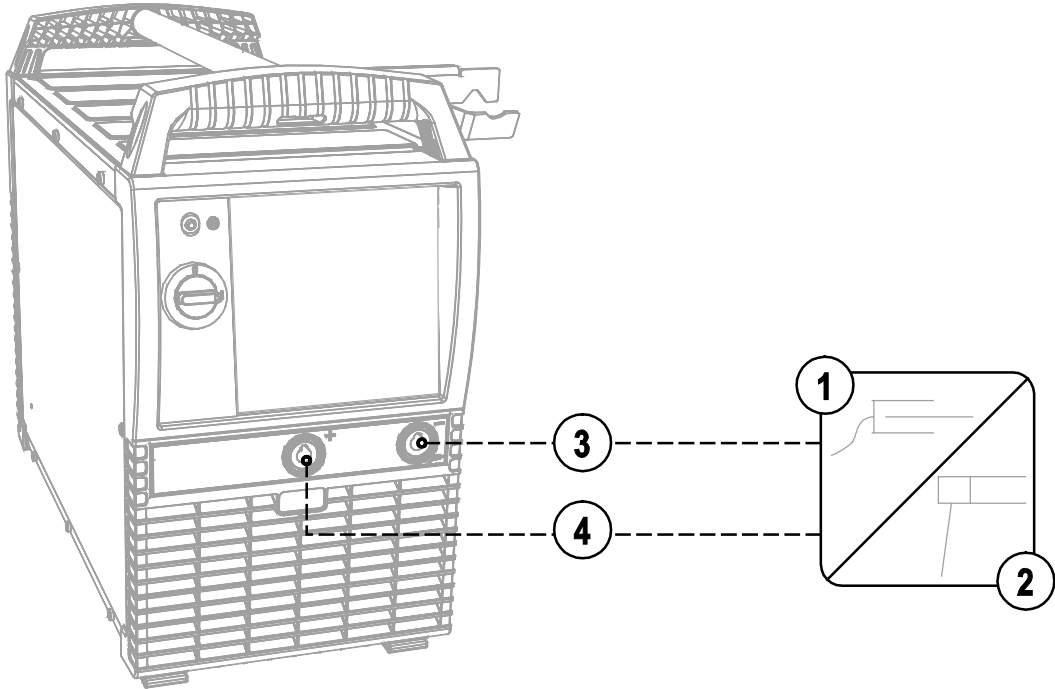






Figure 5-10

Item	Symbol	Description
1		Workpiece
2		Electrode holder
3		Connection socket, "-" welding current
4		Connection socket, "+" welding current

- Insert cable plug of the electrode holder into either the "+" or "-" welding current connection socket and lock by turning to the right.
- Insert cable plug of the workpiece lead into either the "+" or "-" welding current connection socket and lock by turning to the right.

NOTE

 **Polarity depends on the instructions from the electrode manufacturer given on the electrode packaging.**

5.14 Remote control

CAUTION



Damage to the machine due to improper connection!

The remote controls have been developed to be connected to welding machines or wire feed units only. Connecting them to other machines may cause damage to the machines!

- Observe the operating instructions for the welding machine or wire feed unit!
- Switch off the welding machine before connecting!

NOTE



Please note the relevant documentation of the accessory components.

The operation of the remote control and its settings are directly dependent on the configuration of the respective welding machine or wire feed unit. The settings are defined by changeover switches or by setting special parameters (dependent on the control).

5.15 Interfaces

5.15.1 PC Interfaces

CAUTION



Damage due to the use of non-genuine parts!

The manufacturer's warranty becomes void if non-genuine parts are used!

- Only use system components and options (power sources, welding torches, electrode holders, remote controls, spare parts and replacement parts, etc.) from our range of products!
- Only insert and lock accessory components into the relevant connection socket when the machine is switched off.



Equipment damage or faults may occur if the PC is connected incorrectly!

Not using the SECINT X10USB interface results in equipment damage or faults in signal transmission. The PC may be destroyed due to high frequency ignition pulses.

- Interface SECINT X10USB must be connected between the PC and the welding machine!
- The connection must only be made using the cables supplied (do not use any additional extension cables)!

NOTE



Please note the relevant documentation of the accessory components.

PC 300 welding parameter software

Create all welding parameters quickly on the PC and easily transfer them to one or more welding machines (accessories: set consisting of software, interface, connection leads).

Q-DOC 9000 welding data documentation software

(Accessories: set consisting of software, interface, connection leads)

The ideal tool for welding data documentation of, for example: welding voltage and current, wire speed and motor current.

WELDAQS welding data monitoring and documentation system

Network-compatible welding data monitoring and documentation system for digital machines

6 Maintenance, care and disposal



DANGER



Risk of injury from electric shock!

Cleaning machines that are not disconnected from the mains can lead to serious injuries!

- Disconnect the machine completely from the mains.
- Remove the mains plug!
- Wait for 4 minutes until the capacitors have discharged!

6.1 General

When used in the specified environmental conditions and under normal operating conditions, this machine is largely maintenance-free and requires a minimum of care.

There are some points, which should be observed, to guarantee fault-free operation of your welding machine. Among these are regular cleaning and checking as described below, depending on the pollution level of the environment and the length of time the unit is in use.

6.2 Maintenance work, intervals

CAUTION



Electric current!

Repairs may only be carried out by authorised specialist staff!

- Do not remove the torch from the hose package!
- Never clamp the torch body in a vice or similar, as this can cause the torch to be irreparably destroyed!
- If damage occurs to the torch or to the hose package which cannot be corrected as part of the maintenance work, the entire torch must be returned to the manufacturer

6.2.1 Daily maintenance tasks

- Check that all connections and wearing parts are hand-tight and tighten if necessary.
- Check that all screw and plug connections and replaceable parts are secured correctly, tighten if necessary.
- Remove any spatter.
- Clean the wire feed rollers on a regular basis (depending on the degree of soiling).

6.2.1.1 Visual inspection

- Check hose package and power connections for exterior damage and replace or have repaired by specialist staff as necessary!
- Mains supply lead and its strain relief
- Gas tubes and their switching equipment (solenoid valve)
- Other, general condition

6.2.1.2 Functional test

- Check correct mounting of the wire spool.
- Welding current cables (check that they are fitted correctly and secured)
- Gas cylinder securing elements
- Operating, message, safety and adjustment devices (Functional test)

6.2.2 Monthly maintenance tasks

6.2.2.1 Visual inspection

- Casing damage (front, rear and side walls)
- Wheels and their securing elements
- Transport elements (strap, lifting lugs, handle)
- Check coolant tubes and their connections for impurities

6.2.2.2 Functional test

- Selector switches, command devices, emergency stop devices, voltage reducing devices, message and control lamps
- Check that the wire guide elements (inlet nipple, wire guide tube) are fitted securely.

6.2.3 Annual test (inspection and testing during operation)

NOTE



The welding machine may only be tested by competent, capable persons!
A capable person is one who, because of his training, knowledge and experience, is able to recognise the dangers that can occur while testing welding power sources as well as possible subsequent damage and who is able to implement the required safety procedures.



For further information, please see the accompanying supplementary sheets "Machine and Company Data, Maintenance and Testing, Warranty"!

A periodic test according to IEC 60974-4 "Periodic inspection and test" has to be carried out. In addition to the regulations on testing given here, the relevant local laws and regulations must also be observed.

6.3 Maintenance work



DANGER



Do not carry out any unauthorised repairs or modifications!

To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!

The warranty becomes null and void in the event of unauthorised interference.

- Appoint only skilled persons for repair work (trained service personnel)!

Repair and maintenance work may only be performed by qualified authorised personnel; otherwise the right to claim under warranty is void. In all service matters, always consult the dealer who supplied the machine. Return deliveries of defective equipment subject to warranty may only be made through your dealer. When replacing parts, use only original spare parts. When ordering spare parts, please quote the machine type, serial number and item number of the machine, as well as the type designation and item number of the spare part.

6.4 Disposing of equipment

NOTE



Proper disposal!

The machine contains valuable raw materials, which should be recycled, and electronic components, which must be disposed of.

- Do not dispose of in household waste!
- Observe the local regulations regarding disposal!



6.4.1 Manufacturer's declaration to the end user

- According to European provisions (guideline 2002/96/EG of the European Parliament and the Council of January, 27th 2003), used electric and electronic equipment may no longer be placed in unsorted municipal waste. It must be collected separately. The symbol depicting a waste container on wheels indicates that the equipment must be collected separately.
This machine is to be placed for disposal or recycling in the waste separation systems provided for this purpose.
- According to German law (law governing the distribution, taking back and environmentally correct disposal of electric and electronic equipment (ElektroG) from 16.03.2005), used machines are to be placed in a collection system separate from unsorted municipal waste. The public waste management utilities (communities) have created collection points at which used equipment from private households can be disposed of free of charge.
- Information about giving back used equipment or about collections can be obtained from the respective municipal administration office.
- EWM participates in an approved waste disposal and recycling system and is registered in the Used Electrical Equipment Register (EAR) under number WEEE DE 57686922.
- In addition to this, returns are also possible throughout Europe via EWM sales partners.

6.5 Meeting the requirements of RoHS

We, EWM HIGHTEC Welding GmbH Mündersbach, hereby confirm that all products supplied by us which are affected by the RoHS Directive, meet the requirements of the RoHS (Directive 2002/95/EC).

7 Rectifying faults

All products are subject to rigorous production checks and final checks. If, despite this, something fails to work at any time, please check the product using the following flowchart. If none of the fault rectification procedures described leads to the correct functioning of the product, please inform your authorised dealer.

7.1 Checklist for rectifying faults

NOTE



The correct machine equipment for the material and process gas in use is a fundamental requirement for perfect operation!

Legend	Symbol	Description
	↗	Fault/Cause
	✕	Remedy

Coolant error/no coolant flowing

- ↗ Insufficient coolant flow
 - ✕ Check coolant level and refill if necessary
- ↗ Air in the coolant circuit
 - ✕ see chapter "Vent coolant circuit"

Wire feed problems



- ↗ Contact tip blocked
 - ✕ Clean, spray with anti-spatter spray and replace if necessary
- ↗ Setting the spool brake (see "Setting the spool brake" chapter)
 - ✕ Check settings and correct if necessary
- ↗ Setting pressure units (see "Inching wire electrodes" chapter)
 - ✕ Check settings and correct if necessary
- ↗ Worn wire rolls
 - ✕ Check and replace if necessary
- ↗ Wire feed motor without supply voltage (automatic cutout triggered by overloading)
 - ✕ Reset triggered fuse (rear of the power source) by pressing the key button
- ↗ Kinked hose packages
 - ✕ Extend and lay out the torch hose package
- ↗ Wire guide core or spiral is dirty or worn
 - ✕ Clean core or spiral; replace kinked or worn cores

Functional errors

- ↗ Machine control without displaying the signal lights after switching on
 - ✕ Phase failure > check mains connection (fuses)
- ↗ No welding performance
 - ✕ Phase failure > check mains connection (fuses)
- ↗ Various parameters cannot be set
 - ✕ Entry level is blocked, disable access lock (see chapter entitled "Lock welding parameters against unauthorised access")
- ↗ Connection problems
 - ✕ Make control lead connections and check that they are fitted correctly.
- ↗ Loose welding current connections
 - ✕ Tighten power connections on the torch and/or on the workpiece
 - ✕ Tighten contact tip correctly

7.2 Error messages (power source)

NOTE

-  A welding machine error is indicated by an error code being displayed (see table) on the display on the machine control.
In the event of a machine error, the power unit is shut down.
-  The display of possible error numbers depends on the machine version (interfaces/functions).




- Document machine errors and inform service staff as necessary.
- If multiple errors occur, these are displayed in succession.

Error	Category			Possible cause	Remedy
	a)	b)	c)		
Error 1 (Ov.Vol)	-	-	x	Mains overvoltage	Check the mains voltages and compare with the connection voltages of the welding machine
Error 2 (Un.Vol)	-	-	x	Mains undervoltage	
Error 3 (Temp)	x	-	-	Welding machine excess temperature	Allow the machine to cool down (mains switch to "1")
Error 4 (Water)	xx	x	-	Low coolant level	Top off the coolant Leak in the coolant circuit > rectify the leak and top off the coolant Coolant pump is not working > check excess current trigger on air cooling unit
Error 5 (Wi.Spe)	x	-	-	Wire feeder, speedometer error	Check the wire feeder speedometer is not issuing a signal, M3.00 defective > inform Service
Error 6 (gas)	x	-	-	Shielding gas error	Check shielding gas supply (for machines with shielding gas monitoring)
Error 7 (Se.Vol)	-	-	x	Secondary excess voltage	Inverter error > inform Service
Error 8 (no PE)	-	-	x	Earth fault between welding wire and earth line (Phoenix 330 only)	Separate the connection between the welding wire and casing or an earthed object
Error 9 (fast stop)	x	-	-	Fast cut-out triggered by BUSINT X11 or RINT X12	Rectify error on robot
Error 10 (no arc)	-	x	-	Arc break triggered by BUSINT X11 or RINT X12	Check wire feeding
Error 11 (no ign)	-	x	-	Ignition fault after 5 s triggered by BUSINT X11 or RINT X12	Check wire feeding
Error 14 (no DV)	-	x	-	Wire feeder not detected. Control cable not connected.	Check cable connections
				Incorrect ID numbers assigned during operation with multiple wire feeders.	Check assignment of ID numbers (see the "Changing ID number of wire feeder" chapter)
Error 15 (DV2?)	-	x	-	Wire feeder 2 not detected. Control cable not connected.	Check cable connections
Error 16 (VRD)	-	-	x	VRD (open circuit voltage reduction error)	Inform Service
Error 17 (WF. Ov.)	-	x	x	Wire feed mechanism overcurrent detection	Check the wire feeding

Legend for categories (error reset)

a) The error message will disappear once the error has been rectified.

b) The error message can be reset by pressing a key button:

Welding machine control	Key button
RC1 / RC2	
Expert	
CarExpert / Progress (M3.11)	
alpha Q / Concept / Basic / Basic S / Synergic / Synergic S / Progress (M3.71) Picomig 305	not possible

c) The error message can only be reset by switching the machine off and on again.

The shielding gas error (Err 6) can be reset by pressing the "Welding parameters" key button.

7.3 Resetting JOBs (welding tasks) to the factory settings

7.3.1 Resetting a single JOB

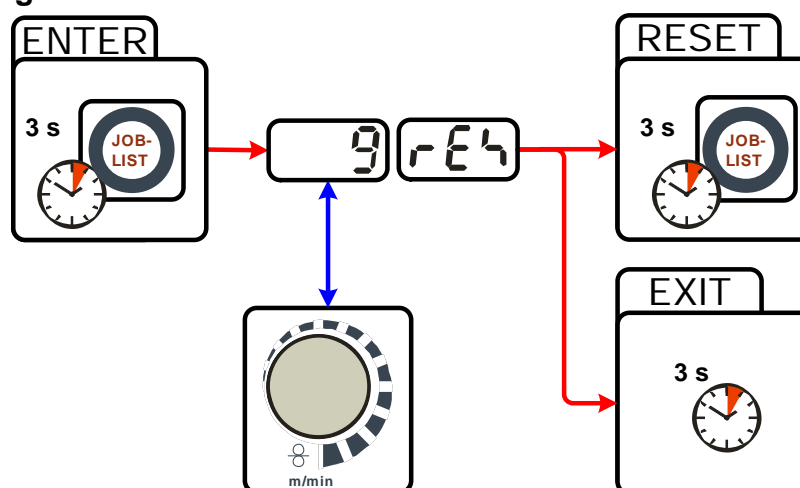
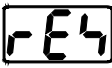
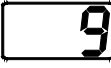


Figure 7-1

Display	Setting/selection
	Reset to factory settings The RESET will be done after pressing the button. The menu will be ended when no changes are done after 3 sec.
	JOB-number (example) The shown JOB will be set to ex works.

7.3.2 Resetting all JOBs

NOTE

All customised welding parameters that are stored will be replaced by the factory settings.

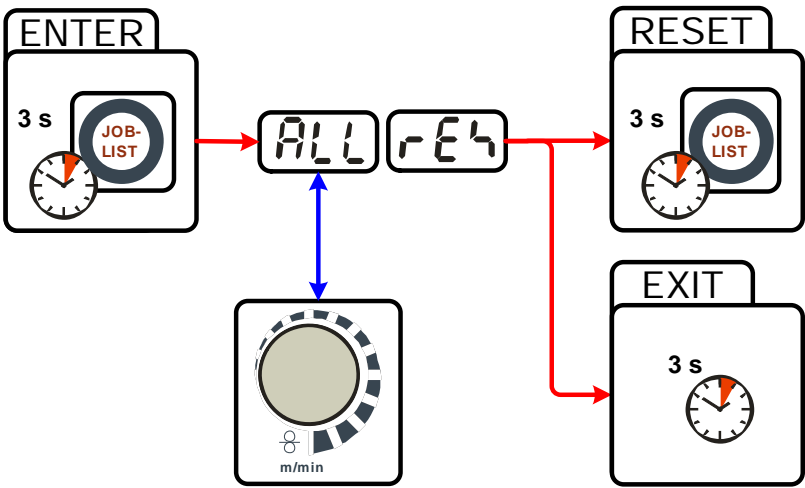




Figure 7-2

Display	Setting/selection
	Reset to factory settings The RESET will be done after pressing the button. The menu will be ended when no changes are done after 3 sec.

7.4 Vent coolant circuit

NOTE

-  Coolant tank and quick connect coupling of coolant supply and return are only fitted in machines with water cooling.
-  To vent the cooling system always use the blue coolant connection, which is located as deep as possible inside the system (close to the coolant tank)!

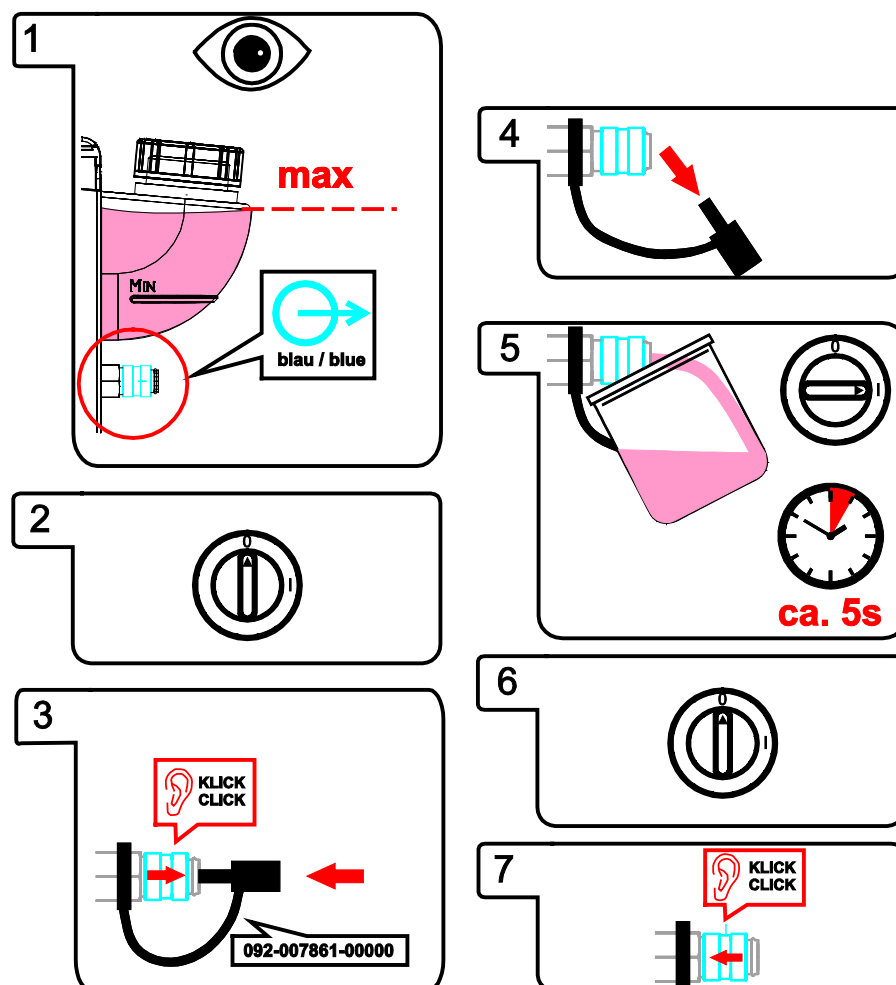


Figure 7-3

8 Technical data

NOTE



Performance specifications and guarantee only in connection with original spare and replacement parts!

8.1 Taurus 355 TDM

	MIG/MAG	TIG	MMA
Setting range for welding current	5 A–350 A		
Setting range for welding voltage	14,3 V - 31,5 V	10,2 V - 24,0 V	20,2 V - 34,0 V
Duty cycle	40 °C		
60%	350 A		
100%	300 A		
Load alternation	10 min. (60% DC \triangle 6 min. welding, 4 min. pause)		
Open circuit voltage	79 V		
Mains voltage (tolerances)	3 x 400 V (-25% to +20%)		
Frequency	50/60 Hz		
Mains fuse (safety fuse, slow-blow)	3 x 25 A		
Mains connection lead	H07RN-F4G4		
Max. connected load	13,9 kVA	10,6 kVA	15,0 kVA
Recommended generator rating	20,2 kVA		
cos ϕ	0.99		
Insulation class/protection classification	H/IP 23		
Ambient temperature	-25 °C to +40 °C		
Machine/torch cooling	Fan/gas		
Workpiece lead	70 mm ²		
Dimensions (L x W x H)	625 mm x 300 mm x 535 mm		
Weight	41 kg		
EMC class	A		
Constructed to standards	IEC 60974 -1, -10 S / C E		

8.2 Taurus 405 TDM

	TIG	MIG/MAG	MMA
Setting range for welding current	5 A–400 A		
Setting range for welding voltage	10.2 V–26.0 V	14.3 V–34.0 V	20.2 V–36.0 V
Duty cycle	40 °C		
100%	400 A		
Load alternation	10 min. (60% DC Δ 6 min. welding, 4 min. pause)		
Open circuit voltage	79 V		
Mains voltage (tolerances)	3 x 400 V (-25% to +20%)		
Frequency	50/60 Hz		
Mains fuse (safety fuse, slow-blow)	3 x 35 A		
Mains connection lead	H07RN-F4G4		
Max. connected load	13.1 kVA	17.2 kVA	18.2 kVA
Recommended generator rating	25.0 kVA		
cos ϕ	0.99		
Insulation class/protection classification	H/IP 23		
Ambient temperature	-25 °C to +40 °C		
Machine/torch cooling	Fan/gas		
Workpiece lead	70 mm ²		
Dimensions (L x W x H)	625 mm x 300 mm x 535 mm		
Weight	41 kg		
EMC class	A		
Constructed to standards	IEC 60974 -1, -10 S / C E		

8.3 Taurus 505 TDM

	TIG		MIG/MAG		MMA	
Setting range for welding current	5 A–500 A					
Setting range for welding voltage	10.2 V–32.0 V		14.3 V–39.0 V		20.2 V–40.0 V	
Duty cycle	40 °C	25 °C	40 °C	25 °C	40 °C	25 °C
60 %	500 A	-	500 A	-	500 A	-
65 %	-	500 A	-	500 A	-	500 A
100 %	430 A	460 A	430 A	460 A	430 A	460 A
Load alternation	10 min. (60% DC \triangle 6 min. welding, 4 min. pause)					
Open circuit voltage	79 V					
Mains voltage (tolerances)	3 x 400 V (-25% to +20%)					
Frequency	50/60 Hz					
Mains fuse (safety fuse, slow-blow)	3 x 35 A					
Mains connection lead	H07RN-F4G4					
Max. connected load	18.9 kVA		24.6 kVA		25.3 kVA	
Recommended generator rating	35.0 kVA					
cos ϕ	0.99					
Insulation class/protection classification	H/IP 23					
Ambient temperature	-25 °C to +40 °C					
Machine/torch cooling	Fan/gas					
Workpiece lead	95 mm ²					
Dimensions (L x W x H)	625 mm x 300 mm x 535 mm					
Weight	45 kg					
EMC class	A					
Constructed to standards	IEC 60974 -1, -10 S / C E					

9 Accessories

NOTE



Performance-dependent accessories like torches, workpiece leads, electrode holders or intermediate hose packages are available from your authorised dealer.

9.1 System components

Type	Designation	Item no.
Taurus Synergic S drive 4L WE	Wire feed unit, water, Euro central connector	090-005201-00502
Taurus Synergic S drive 4 WE	Wire feed unit, water, Euro central connector	090-005199-00502
Taurus Synergic S drive 300C	Wire feed unit, water, Euro central connector	090-005205-00502
Taurus Synergic S drive 200C	Wire feed unit, water, Euro central connector	090-005204-00502

9.2 Options

Type	Designation	Item no.
ON Filter 355/405/505/50	Contamination filter for air inlet	092-002698-00000
ON CS 405/505	Crane console, transport/ram protection Phoenix/Taurus 405/505	092-007895-00000
ON FC CS 405/505	Pedestal for transport with floor conveyors	092-007896-00000
ON WAK CS 405/505	Wheel assembly kit for CS 505	092-007897-00000

9.3 Welding torch cooling system

Type	Designation	Item no.
cool50-2 U40	Cooling module	090-008603-00502

9.4 Transport systems

Type	Designation	Item no.
ON TR Trolley 55.2-2	Cross arm and holder for wire feeder	092-002700-00000
ON PS Trolley 55.2-2 drive 4L	Pivot support for drive 4L on Trolley 55.2-2	092-002701-00000
ON PS Trolley 55.2-2 drive 200/300c	Pivot support	092-002634-00000
Trolley 55.2-2	Transport vehicle	090-008630-00000

9.5 Remote control / connection cable

Type	Designation	Item no.
R40 7POL	Remote control, 10 programs	090-008088-00000
FRV 7POL 1 m	Extension/connecting cable	092-000201-00002
FRV 7POL 5 m	Extension/connecting cable	092-000201-00003
FRV 7POL 10 m	Extension/connecting cable	092-000201-00000
FRV 7POL 20 m	Extension/connecting cable	092-000201-00001

9.6 General accessories

Type	Designation	Item no.
5POLE/CEE/32A/M	Machine plug	094-000207-00000
DM1 35L/MIN	Manometer pressure regulator	094-000009-00000

9.7 Computer communication

Type	Designation	Item no.
PC300.Net	PC300.Net welding parameter software kit incl. cable and SECINT X10 USB interface	090-008777-00000
CD PC300.Net update	PC300.Net Update on CD-ROM	092-008172-00001
FRV 7POL 5 m	Extension/connecting cable	092-000201-00003
FRV 7POL 10 m	Extension/connecting cable	092-000201-00000
FRV 7POL 20 m	Extension/connecting cable	092-000201-00001
QDOC9000 V2.0	Set consisting of interface, documentation software, connection lead	090-008713-00000

10 Appendix A

10.1 JOB-List

ewm® JOB-LIST 094-016122-00582						
	Material	Gas	Wire			
			0,8	1,0	1,2	1,6
			Job-Nr.			
● Massivdraht / Solid Wire	SG2/3 G3/4 Si1	CO ₂ 100 / C1	1	3	4	5
		Ar80-90 / M2	6	8	9	10
	CrNi	Ar91-99 / M12-M13	34	35	36	37
		Ar/He / I3	42	43	44	45
	CuSi	Ar100 / I1	98	99	100	101
	CuAl	Ar100 / I1	106	107	108	109
	CuSi Löten / Brazing	Ar100 / I1	114	115	116	117
		Ar91-99 / M12-M13	110	111	112	113
	CuAl Löten / Brazing	Ar100 / I1	122	123	124	125
		Ar91-99 / M12-M13	118	119	120	121
	AlMg	Ar100 / I1	74	75	76	77
		Ar/He / I3	78	79	80	81
	AlSi	Ar100 / I1	82	83	84	85
		Ar/He / I3	86	87	88	89
	Al99	Ar100 / I1	90	91	92	93
		Ar/He / I3	94	95	96	97
● Fülldraht / Flux-Cored	SG2/3 G3/4 Si1 Metal	Ar80-90 / M2	235	237	238	239
	SG2/3 G3/4 Si1 Rutil / Basic	Ar80-90 / M2	240	242	243	244
	CrNi Metal	Ar91-99 / M12-M13	227	228	229	230
	CrNi Rutil / Basic	Ar98/2 / M13	231	232	233	234
		Ar92/8 / M22	210	211	212	213
● forceArc	SG2/3 G3/4 Si1	Ar91-99 / M12-M13	190	254	255	256
		Ar80-90 / M2	189	179	180	181
	CrNi	Ar91-99 / M12-M13		251	252	253
	AlMg	Ar100 / I1			247	248
	AlSi	Ar100 / I1			249	250
	Al99	Ar100 / I1			245	246
	SP1		129			
	SP2		130			
	SP3		131			
	GMAW non synergic <8m / min		188			
	GMAW non synergic >8m / min		187			
	Fugen / gouging		126			
	WIG / TIG		127			
	E-Hand / MMA		128			

ewm® JOB-LIST 094-015723-00500						
rootArc	Material	Gas	Wire			
			0,8	1,0	1,2	1,6
			Job-Nr.			
●	SG2/3 G3/4 Si1	CO ₂ 100 / C1	204	205		
		Ar80-90 / M2	206	207		

Figure 10-1

11 Appendix B

11.1 Overview of EWM branches

Headquarters

EWM HIGHTEC WELDING GmbH

Dr. Günter-Henle-Straße 8
56271 Mündersbach · Germany
Tel: +49 2680 181-0 · Fax: -244
www.ewm-group.com · info@ewm-group.com

Technology centre

EWM HIGHTEC WELDING GmbH

Forststr. 7-13
56271 Mündersbach · Germany
Tel: +49 2680 181-0 · Fax: -144
www.ewm-group.com · info@ewm-group.com



Production, Sales and Service

EWM HIGHTEC WELDING GmbH
Dr. Günter-Henle-Straße 8
56271 Mündersbach · Germany
Tel: +49 2680 181-0 · Fax: -244
www.ewm-group.com · info@ewm-group.com

EWM HIGHTEC WELDING (Kunshan) Ltd.
10 Yuanshan Road, Kunshan · New & High-tech Industry Development Zone
Kunshan · Jiangsu · 215300 · People's Republic of China
Tel: +86 512 57867-188 · Fax: -182
www.ewm-kunshan.cn · info@ewm-kunshan.cn

EWM HIGHTEC WELDING AUTOMATION GmbH
Boxbachweg 4
08606 Oelsnitz/V. · Germany
Tel: +49 37421 20-300 · Fax: -318
www.ewm-automation.de · info@ewm-automation.de

EWM HIGHTEC WELDING s.r.o.
Tr. 9. května 718 / 31
407 53 Jirřkov · Czech Republic
Tel: +420 412 358-551 · Fax: -504
www.ewm-jirřkov.cz · info@ewm-jirřkov.cz

Sales and Service Germany

EWM HIGHTEC WELDING GmbH
Vertriebs- und Technologiezentrum
Grünauer Fenn 4
14712 Rathenow · Tel: +49 3385 49402-0 · Fax: -20
www.ewm-rathenow.de · info@ewm-rathenow.de

EWM HIGHTEC WELDING GmbH
Lindenstraße 1a
38723 Seesen-Rhüden · Tel: +49 5384 90798-0 · Fax: -20
www.ewm-seesen.de · info@ewm-seesen.de

EWM HIGHTEC WELDING GmbH
Sachsstraße 28
50259 Pulheim · Tel: +49 2234 697-047 · Fax: -048
www.ewm-pulheim.de · info@ewm-pulheim.de

EWM HIGHTEC WELDING GmbH
In der Florinskaul 14-16
56218 Mülheim-Kärlich · Tel: +49 261 988898-0 · Fax: -20
www.ewm-muelheim-kaerlich.de · info@ewm-muelheim-kaerlich.de

EWM HIGHTEC WELDING GmbH
Vertriebs- und Logistikzentrum
Sälzerstr. 20
56235 Ransbach-Baumbach · Tel: +49 2623 9276-0 · Fax: -244
www.ewm-ransbach-baumbach.de · info@ewm-ransbach-baumbach.de

EWM HIGHTEC WELDING GmbH
Eiserfelder Straße 300
57080 Siegen · Tel: +49 271 3878103-0 · Fax: -9
www.ewm-siegen.de · info@ewm-siegen.de

EWM HIGHTEC WELDING GmbH
Vertriebs- und Technologiezentrum
Draisstraße 2a
69469 Weinheim · Tel: +49 6201 84557-0 · Fax: -20
www.ewm-weinheim.de · info@ewm-weinheim.de

EWM Schweißtechnik Handels GmbH
Bildstock 9/3-4
88085 Langenargen · Tel: +49 7543 9344-30 · Fax: -50
www.ewm-langenargen.de · info@ewm-langenargen.de

EWM Schweißtechnik Handels GmbH
Rittergasse 1
89143 Blaubeuren · Tel: +49 7344 9191-75 · Fax: -77
www.ewm-blaubeuren.de · info@ewm-blaubeuren.de

EWM Schweißtechnik Handels GmbH
Heinkelstraße 8
89231 Neu-Ulm · Tel: +49 731 7047939-0 · Fax: -15
www.ewm-neu-ulm.de · info@ewm-neu-ulm.de

EWM HIGHTEC WELDING AUTOMATION GmbH
Steinfeldstrasse 15
90425 Nürnberg · Tel: +49 911 3841-727 · Fax: -728
www.ewm-automation.de · info@ewm-automation.de

Sales and Service International

EWM HIGHTEC WELDING GmbH
Fichtenweg 1
4810 Gmunden · Austria · Tel: +43 7612 778 02-0 · Fax: -20
www.ewm-gmunden.at · info@ewm-gmunden.at

EWM HIGHTEC WELDING UK Ltd.
Unit 28 Coopies Way · Coopies Lane Industrial Estate
Morpeth · Northumberland · NE61 6JN · Great Britain
Tel: +44 1670 505875 · Fax: -514305
www.ewm-morpeth.co.uk · info@ewm-morpeth.co.uk

EWM HIGHTEC WELDING (Kunshan) Ltd.
10 Yuanshan Road, Kunshan · New & High-tech Industry Development Zone
Kunshan · Jiangsu · 215300 · People's Republic of China
Tel: +86 512 57867-188 · Fax: -182
www.ewm-kunshan.cn · info@ewm-kunshan.cn

EWM HIGHTEC WELDING Sales s.r.o. / Prodejní a poradenské centrum
Tyrřova 2106
256 01 Beneřov u Prahy · Czech Republic
Tel: +420 317 729-517 · Fax: -712
www.ewm-benesov.cz · info@ewm-benesov.cz

EWM HIGHTEC WELDING FZCO / Regional Office Middle East
LOB 21 G 16 · P.O. Box 262851
Jebel Ali Free Zone · Dubai, UAE · United Arab Emirates
Tel: +971 48870-322 · Fax: -323
www.ewm-dubai.ae · info@ewm-dubai.ae

 Plants

 Branches

● More than 300 EWM sales partners worldwide